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Kim

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(54) **DISPLAY DEVICE AND MANUFACTURING METHOD OF THE SAME**

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H01L 29/04	(2006.01)
H01L 33/00	(2010.01)
H01L 51/52	(2006.01)
H01L 51/56	(2006.01)

(52) **U.S. Cl.**

CPC ***H01L 51/5246*** (2013.01); ***H01L 51/5293*** (2013.01); ***H01L 51/56*** (2013.01)

(58) **Field of Classification Search**

CPC . H01L 51/50; H01L 51/5237; H01L 51/5246; H01L 27/323; H01L 27/3272; H01L 27/3244; H01L 51/5281; H01L 27/1214; H01L 27/12

USPC 257/40, 59, 98, 99, 100, E33.001, 257/E27.111; 361/679.01; 313/112, 504; 348/58; 362/97.2, 97.3

See application file for complete search history.

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(57) **ABSTRACT**

A display device, including: a substrate; a display panel formed on the substrate; a resin layer positioned on the display panel; a polarizer positioned on the resin layer; a window positioned on the polarizer; a first adhesive layer interposed between the window and the polarizer; a printing layer positioned either between the first adhesive layer and the polarizer or between the polarizer and the resin layer; and a supporter surrounding the display panel and the resin layer and supporting the window, in which the printing layer is positioned to correspond to an edge region of the window.

10 Claims, 8 Drawing Sheets

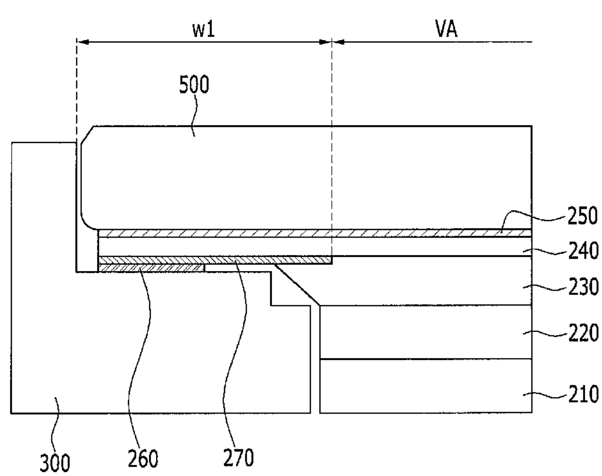


FIG. 1

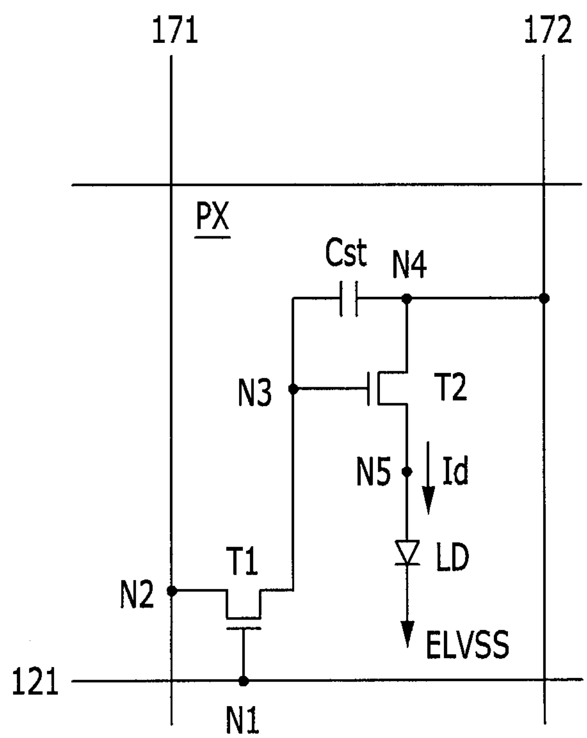
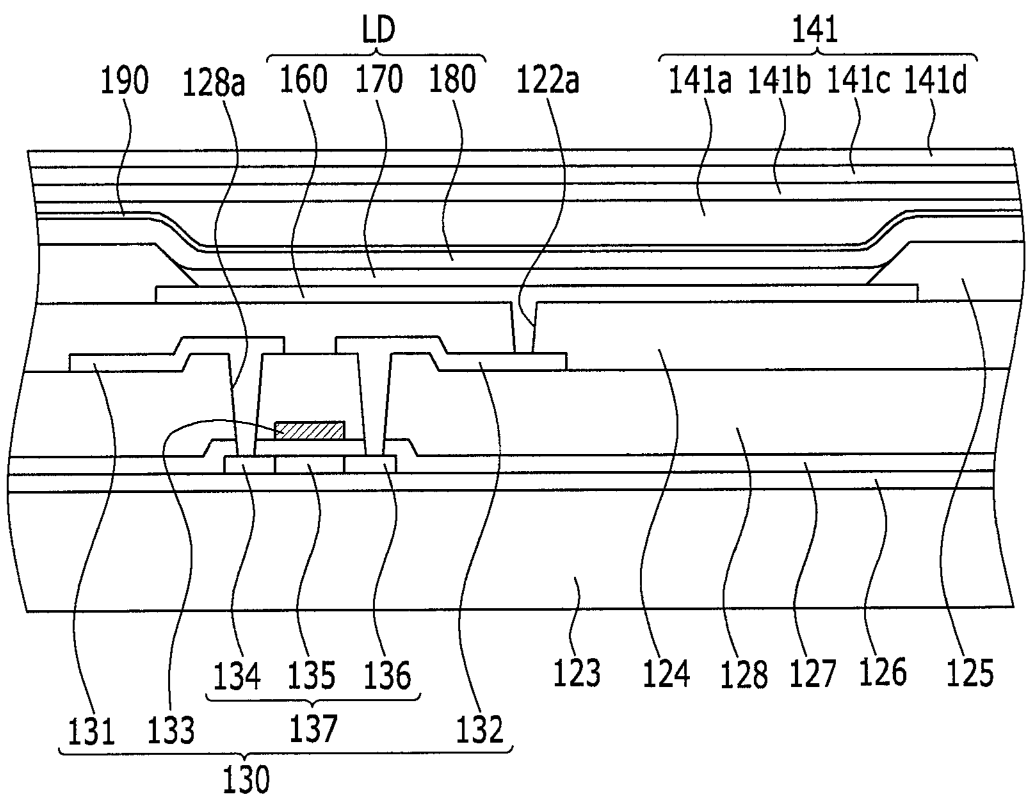


FIG. 2



LD
141
190
128a
160
170
180
122a
141a
141b
141c
141d
134
135
136
123
124
128
127
126
125
131
133
137
132
130

FIG. 3

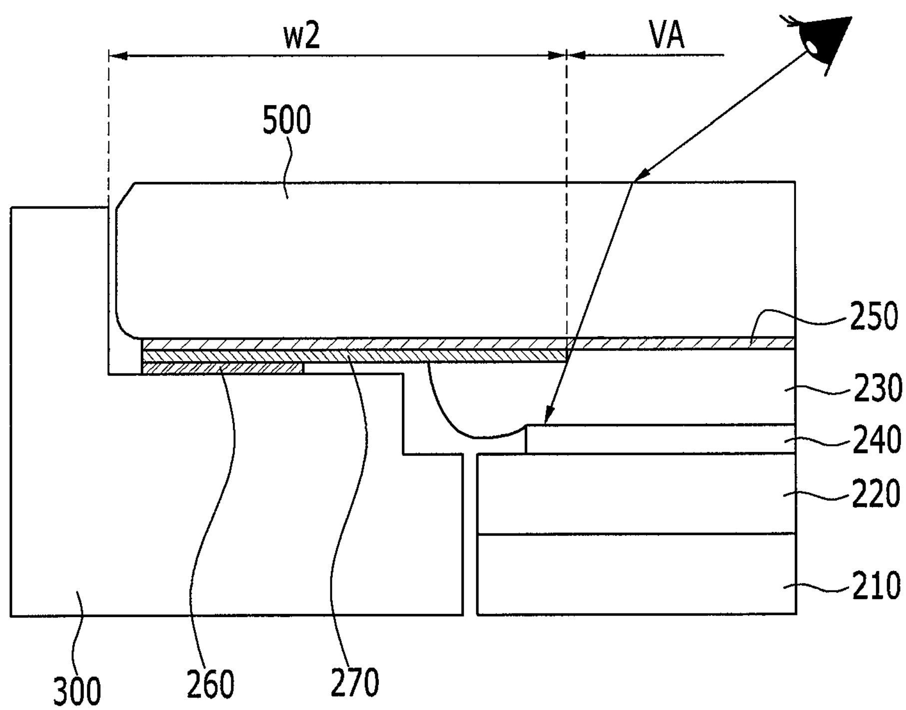


FIG. 4

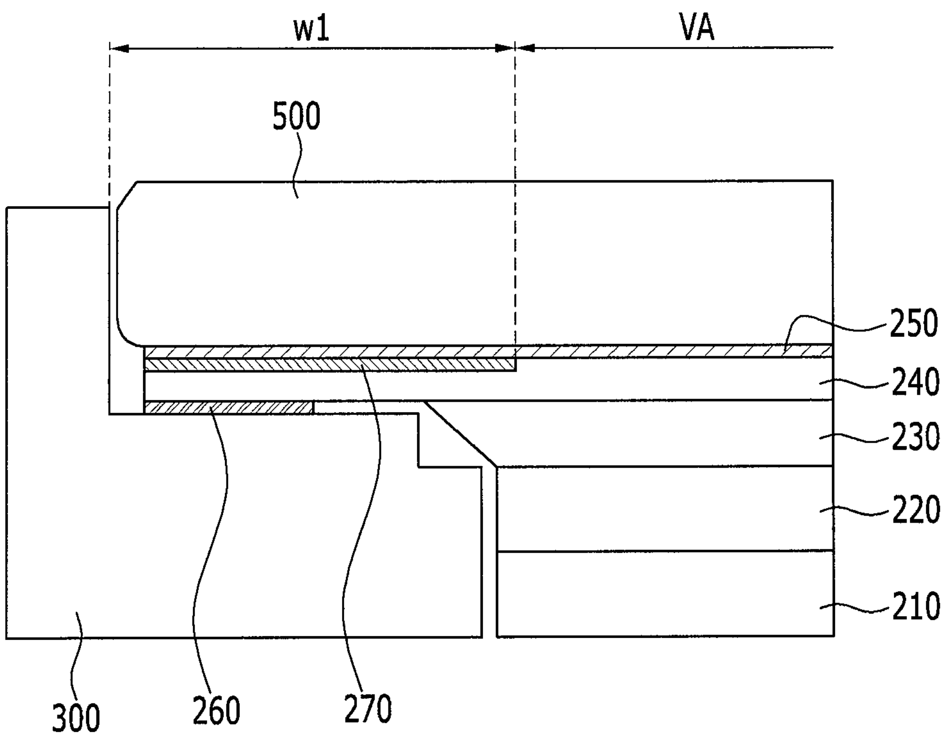


FIG. 5

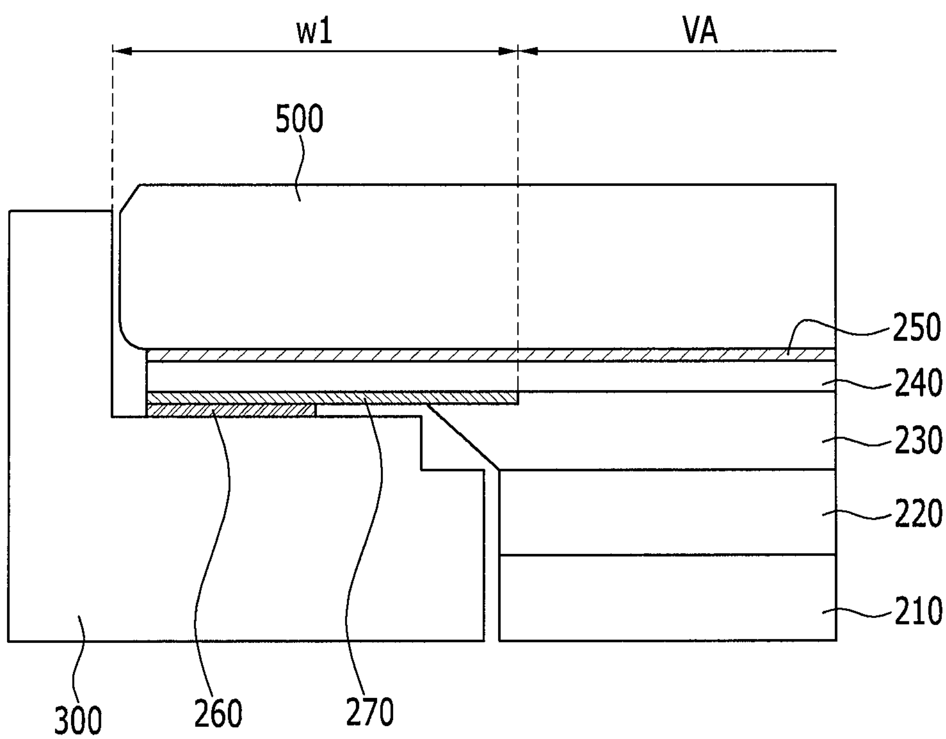


FIG. 6

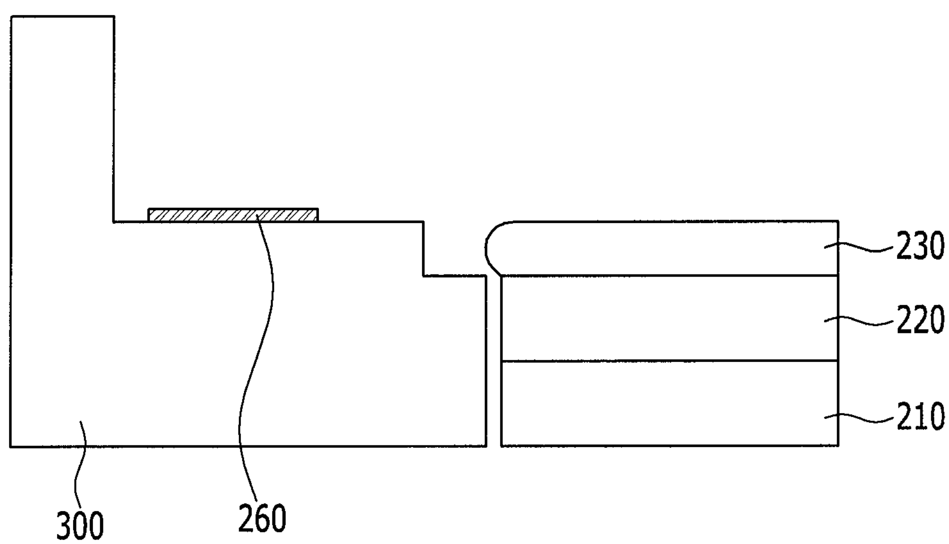


FIG. 7

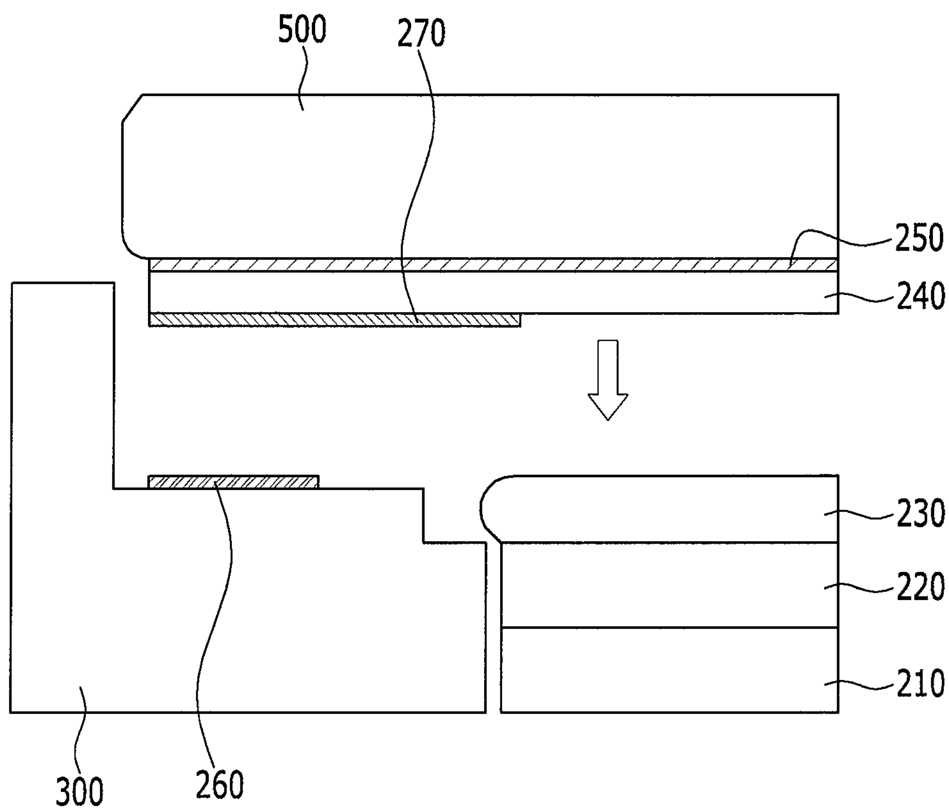
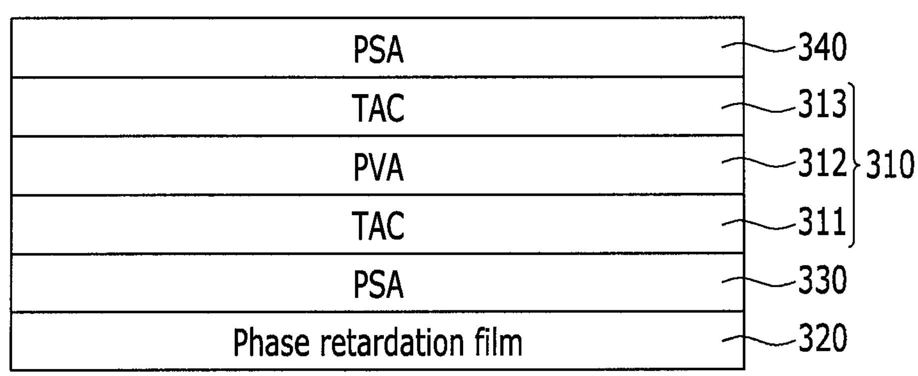


FIG. 8


PSA
340
TAC
313
PVA
312
310
TAC
311
PSA
330
Phase retardation film
320

DISPLAY DEVICE AND MANUFACTURING METHOD OF THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to and the benefit of Korean Patent Application No. 10-2013-0169358 filed in the Korean Intellectual Property Office on Dec. 31, 2013, the entire content of which is incorporated herein by reference.

BACKGROUND

1. Field

The present disclosure relates to a display device and a manufacturing method of the display device.

2. Description of the Related Art

Display devices which are currently known include a liquid crystal display (LCD), a plasma display panel (PDP), an organic light emitting diode device (OLED device), a field effect display (FED), an electrophoretic display device, and the like.

Particularly, the OLED device includes two electrodes and an organic emission layer positioned therebetween, and an electron injected from one electrode and a hole injected from the other electrode are coupled with each other in the organic emission layer to generate an exciton, and the exciton emits energy to emit light.

Since the OLED device has a self-luminance characteristic and does not require a separate light source unlike the LCD, a thickness and a weight thereof may be reduced. Further, since the OLED device has high-grade characteristics such as low power consumption, high luminance, and a high response speed, the OLED device receives attention as a next-generation display device.

Such a display device is formed by laminating a display panel, a polarizer, a resin layer, and a window on a substrate in sequence. In addition, a printing layer is formed at a lower edge of the window to prevent the lower portion of the window from being observed from (exposed to) the outside. In this case, the edge of the polarizer is positioned inside the printing layer.

However, there is a problem in that the edge of the polarizer positioned inside the printing layer is observed from (exposed to) the outside when a user views the edge from the top of the window in an oblique direction.

The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY

Aspects of embodiments of the present invention are directed toward a display device and a manufacturing method thereof having advantages of preventing an edge of a polarizer covered by a printing layer formed below a window from being observed or exposed, when obliquely viewed from the outside of the display device.

An exemplary embodiment provides a display device, including: a substrate; a display panel formed on the substrate; a resin layer positioned on the display panel; a polarizer positioned on the resin layer; a window positioned on the polarizer; a first adhesive layer interposed between the window and the polarizer; a printing layer positioned either between the first adhesive layer and the polarizer or between the polarizer and the resin layer; and a supporter surrounding the display panel and the resin layer and supporting the window, in which the printing layer is positioned to correspond to an edge region of the window.

In this case, an area of the polarizer may be larger than areas of the resin layer and the display panel.

In this case, the area of the polarizer may correspond to an area of the window.

Meanwhile, the polarizer may be supported by the supporter.

In this case, the display device may further include a second adhesive layer interposed between the polarizer and the supporter.

In this case, the second adhesive layer may be a double-sided tape.

Meanwhile, the display panel may include an organic light emitting element.

Meanwhile, the first adhesive layer may be an optical clear adhesive.

Meanwhile, the polarizer may include a linear polarization member and a phase retardation film disposed below the linear polarization member.

In this case, the phase retardation film may be a $\lambda/4$ phase retardation film.

In this case, the polarizer may further include a first polarizer adhesive layer formed on the linear polarization member.

In this case, the polarizer may further include a second polarizer adhesive layer formed between the linear polarization member and the $\lambda/4$ phase retardation film.

Another exemplary embodiment provides a manufacturing method of a display device, including: preparing a substrate; preparing a window with a polarizer disposed on one side of the window; forming a display panel on the substrate; coating a resin layer on the display panel; disposing the substrate, the display panel, and the resin layer inside a supporter surrounding the substrate, the display panel, and the resin layer; attaching the window so that the polarizer faces the supporter and the resin layer; and curing the resin layer.

In this case, a first adhesive layer may be interposed between the window and the polarizer.

In this case, a printing layer may be positioned between the polarizer and the resin layer, and the printing layer may be positioned to correspond to an edge region of the window.

Meanwhile, a printing layer may be positioned between the polarizer and the first adhesive layer, and the printing layer may be positioned to correspond to an edge region of the window.

Meanwhile, the curing of the resin layer may be performed by irradiating ultraviolet rays to the resin layer.

According to the exemplary embodiment, it is possible to prevent an edge of a polarizer positioned below a window from being misrecognized as a defect of the display device by preventing the edge from being exposed, when obliquely viewed from the outside of the display device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an equivalent circuit diagram of one pixel of an organic light emitting diode device.

FIG. **2** is a cross-sectional view of the organic light emitting diode device.

FIG. **3** is a partial cross-sectional view of the display device in which an edge of a polarizer is exposed outside.

FIG. **4** is a partial cross-sectional view of a display device according to an exemplary embodiment.

FIG. **5** is a partial cross-sectional view of a display device according to another exemplary embodiment.

FIG. **6** is a cross-sectional view of the polarizer of FIG. **3**.

FIGS. **7** and **8** illustrate a manufacturing process of a display device according to an exemplary embodiment.

DETAILED DESCRIPTION

Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present invention. On the contrary, exemplary embodiments introduced herein are provided to make disclosed contents thorough and complete and sufficiently transfer the spirit of the present invention to those skilled in the art.

In the drawings, the thickness of layers, films, panels, regions, etc., are exaggerated for clarity. It will be understood that when a layer is referred to as being "on" another layer or substrate, it can be directly on the other layer or substrate, or intervening them may also be present. Like reference numerals designate like elements throughout the specification.

Referring to FIGS. **4** and **5**, in a display device according to an exemplary embodiment, a polarizer **240** is positioned between a window **500** and a resin layer **230**, and an area of the polarizer **240** is largely formed to correspond to an area of the window **500** to prevent an edge of the polarizer **240** from being observed from (exposed to) the outside.

Initially, a display panel configured as a display device according to an exemplary embodiment will be described with reference to FIGS. **1** and **2**. Here, the display panel may correspond to a display panel **220** of FIG. **4**.

The display device described with reference to FIGS. **1** and **2** relates to an organic light emitting diode (OLED) device.

However, the display device according to the exemplary embodiment is not limited thereto, but a liquid crystal display (LCD), a plasma display panel (PDP), a field effect display (FED), an electrophoretic display device, and the like may be applied.

FIG. **1** is an equivalent circuit diagram of one pixel of an organic light emitting diode device. FIG. **2** is a cross-sectional view of the organic light emitting diode device.

Referring to FIG. **1**, the organic light emitting diode device includes a plurality of signal lines **121**, **171**, and **172**, and a pixel PX connected thereto. The pixel PX may be one of a red pixel R, a green pixel G, and a blue pixel B.

The signal lines include a scanning signal line **121** transferring a gate signal (or scanning signal), a data line (or data signal line) **171** transferring a data signal, and a driving voltage line (or driving voltage signal line) **172** transferring a driving voltage. The scanning signal lines **121** extend substantially in a row direction and are substantially parallel to each other, and the data lines **171** extend substantially in a column direction and are substantially parallel to each other. The driving voltage lines **172** extend substantially in a column direction, but may extend in a row direction or a column direction or be formed in a net shape.

In this case, one pixel PX includes a thin film transistor including a switching transistor T**1** and a driving transistor T**2**, a storage capacitor Cst, and an organic light emitting element LD. Although not illustrated, one pixel PX may further include a thin film transistor and a capacitor in order to compensate for a current provided in the organic light emitting element.

The switching transistor T**1** has a control terminal N**1**, an input terminal N**2**, and an output terminal N**3**, and the control terminal N**1** is connected to the scanning signal line **121**, the input terminal N**2** is connected to the data line **171**, and the output terminal N**3** is connected to the driving transistor T**2**. The switching transistor T**1** transfers the data signal received from the data line **171** to the driving transistor T**2** in response to the scanning signal received from the scanning signal line **121**.

In addition, the driving transistor T**2** also has a control terminal N**3**, an input terminal N**4**, and an output terminal N**5**. Here, the control terminal N**3** is connected to the switching transistor T**1**, the input terminal N**4** is connected to the driving voltage line **172**, and the output terminal N**5** is connected to the organic light emitting element LD. The driving transistor T**2** allows an output current Id (with amplitude that varies according to a voltage applied between the control terminal N**3** and the output terminal N**5**) to flow.

In this case, the capacitor Cst is connected between the control terminal N**3** and the input terminal N**4** of the driving transistor T**2**. The capacitor Cst charges the data signal applied to the control terminal N**3** of the driving transistor T**2**, and maintains the charged data signal even after the switching transistor T**1** is turned off.

Meanwhile, the organic light emitting element LD, for example, as an organic light emitting diode (OLED), has an anode connected to the output terminal **N5** of the driving transistor T**2** and a cathode connected to a common voltage source ELVSS. The organic light emitting element LD emits light by varying intensities according to the output current Id of the driving transistor T**2** to display an image.

The organic light emitting element LD may include an organic material which uniquely expresses any one or one or more of the primary colors such as three primary colors of red, green, and blue, and the organic light emitting diode device displays a desired image by a spatial sum of the colors.

The switching transistor T**1** and the driving transistor T**2** are n-channel field effect transistors (FET), but at least one thereof may be a p-channel field effect transistor. Further, a connection relationship of the transistors T**1** and T**2**, the capacitor Cst, and the organic light emitting diode LD may be changed.

Hereinafter, the organic light emitting diode device will be described with reference to a cross-sectional view illustrated in FIG. **2**.

Referring to FIG. **2**, a substrate **123** is formed as an insulating substrate made of glass, quartz, ceramics, metal, plastic, and/or the like. However, the exemplary embodiment is not limited thereto, and the substrate **123** may be formed as a metallic substrate made of stainless steel or the like. Meanwhile, the substrate **123** may correspond to a substrate **210** of FIG. **4**.

In addition, a substrate buffer layer **126** is formed on the substrate **123**. The substrate buffer layer **126** serves to prevent penetration of impure elements and planarize the surface.

In this case, the substrate buffer layer **126** may be made of various materials capable of performing the functions. For example, one of a silicon nitride (SiN_x) layer, a silicon oxide (SiO_x, such as SiO_2) layer, and a silicon oxynitride (SiO_xN_y) layer may be used as the substrate buffer layer **126**. However, the substrate buffer layer **126** is not a necessarily required configuration, and may be omitted according to a kind of substrate **123** and a process condition.

A driving semiconductor layer **137** is formed on the substrate buffer layer **126**.

The driving semiconductor layer **137** is formed as a polysilicon layer. Further, the driving semiconductor layer **137** includes a channel region **135** in which impurities are not doped, and a source region **134** and a drain region **136** in which the impurities are doped at both sides of the channel region **135**. In this case, the doped ion materials are P-type

(P-channel) impurities such as boron (B), and B_2H_6 is mainly used. Here, the impurities vary according to a kind of thin film transistor.

A gate insulating layer **127** made of silicon nitride (SiNx) or silicon oxide (SiO_2) is formed on the driving semiconductor layer **137**. A gate wire including a driving gate electrode **133** is formed on the gate insulating layer **127**. In addition, the driving gate electrode **133** is formed to overlap at least a part of the driving semiconductor layer **137**, particularly, the channel region **135**.

Meanwhile, an interlayer insulating layer **128** covering the driving gate electrode **133** is formed on the gate insulating layer **127**. Contact holes **128***a* exposing the source region **134** and the drain region **136** of the driving semiconductor layer **137** are formed in the gate insulating layer **127** and the interlayer insulating layer **128**. The interlayer insulating layer **128** may be formed by using (utilizing) a ceramic-based material such as silicon nitride (SiN_x) or silicon oxide (SiO_2), like the gate insulating layer **127**.

In addition, a data wire including a driving source electrode **131** and a driving drain electrode **132** is formed on the interlayer insulating layer **128**. Further, the driving source electrode **131** and the driving drain electrode **132** are connected with the source region **134** and the drain region **136** of the driving semiconductor layer **137** through the contact holes **128***a* formed in the interlayer insulating layer **128** and the gate insulating layer **127**, respectively.

As such, the driving thin film transistor **130** including the driving semiconductor layer **137**, the driving gate electrode **133**, the driving source electrode **131**, and the driving drain electrode **132** is formed. The configuration of the driving thin film transistor **130** is not limited to the aforementioned example, and may be variously modified as a known configuration which may be easily implemented by those skilled in the art.

In addition, a planarization layer **124** covering the data wire is formed on the interlayer insulating layer **128**. The planarization layer **124** serves to remove and planarize a step in order to increase emission efficiency of the organic light emitting element to be formed thereon. Further, the planarization layer **124** has an electrode via hole **122***a* exposing a part of the drain electrode **132**.

The planarization layer **124** may be made of one or more materials selected from polyacrylate resin, epoxy resin, phenolic resin, polyamide resin, polyimide resin, unsaturated polyester resin, poly phenylenether resin, poly phenylenesulfide resin, and benzocyclobutene (BCB).

Here, an exemplary embodiment according to the present invention is not limited to the aforementioned structure, and in some cases, one of the planarization layer **124** and the interlayer insulating layer **128** may be omitted.

In this case, a first electrode of the organic light emitting element, that is, a pixel electrode **160** is formed on the planarization layer **124**. That is, the organic light emitting diode device includes a plurality of pixel electrodes **160** which is disposed for every plurality of pixels, respectively. In this case, the plurality of pixel electrodes **160** is spaced apart from each other. The pixel electrode **160** is connected to the drain electrode **132** through the electrode via hole **122***a* of the planarization layer **124**.

Further, a pixel defining layer **125** having an opening exposing the pixel electrode **160** is formed on the planarization layer **124**. That is, the pixel defining layer **125** has a plurality of openings formed for each pixel. In this case, the organic emission layer **170** may be formed for each opening formed by the pixel defining layer **125**. Accordingly, a pixel area in which each organic emission layer is formed by the pixel defining layer **125** may be defined.

In this case, the pixel electrode **160** is disposed to correspond to the opening of the pixel defining layer **125**. However, the pixel electrode **160** is not necessarily disposed only in the opening of the pixel defining layer **125**, but may be disposed below the pixel defining layer **125** so that a part of the pixel electrode **160** overlaps with the pixel defining layer **125**.

The pixel defining layer **125** may be made of resin such as polyacrylates resin and polyimdes, a silica-based inorganic material, and/or the like.

Meanwhile, an organic emission layer **170** is formed on the pixel electrode **160**.

In addition, a second electrode, that is, a common electrode **180** may be formed on the organic emission layer **170**. As such, the organic light emitting diode LD (including the pixel electrode **160**, the organic emission layer **170**, and the common electrode **180**) is formed.

In this case, each of the pixel electrode **160** and the common electrode **180** may be made of a transparent conductive material or a transflective or reflective conductive material. According to a kind of materials forming the pixel electrode **160** and the common electrode **180**, the organic light emitting diode device may be a top emission device, a bottom emission device, or a double-sided emission device.

Meanwhile, an overcoat **190** covering and protecting the common electrode **180** may be formed as an organic layer on the common electrode **180**.

In addition, a thin film encapsulation layer **141** is formed on the overcoat **190**. The thin film encapsulation layer **141** encapsulates and protects the organic light emitting element LD and a driving circuit part formed on the substrate **123** from the outside.

The thin film encapsulation layer **141** includes encapsulation organic layers **141***a* and **141***c* and encapsulation inorganic layers **173** and **121***d* which are alternately laminated. In FIG. **2**, for example, a case where two encapsulation organic layers **141***a* and **141***c* and two encapsulation inorganic layers **141***b* and **141***d* are alternately laminated to configure the thin film encapsulation layer **141** is illustrated, but is not limited thereto.

Also, referring to FIG. **4**, a resin layer **230** is formed on a display panel **220**. The resin layer **230** may bond a window **500** to which a polarizer **240** is attached and the display panel **220**.

In this case, the resin layer **230** may be formed by curing a liquid resin.

In addition, the polarizer **240** may be positioned on the resin layer **230**. The polarizer **240** converts an optical axis of light emitted to the outside through the display panel **220**.

Referring to FIG. **8**, the configuration of the polarizer **240** according to the exemplary embodiment will be described. The polarizer **240** includes a linear polarization member **310** and a phase retardation film **320** disposed below the linear polarization member **310**.

The linear polarization member **310** includes a polarizer layer **312**, and a lower supporter **311** and an upper supporter **313** supporting the polarizer layer. The polarizer layer **312** may be made of poly vinylalcohol (PVA), and the lower supporter **311** and the upper supporter **313** may be made of triacetyl cellulous (TAC).

The phase retardation film **320** may be a $\lambda/4$ phase retardation film, and serves to convert the linear polarization into a circular polarization, or the circular polarization into the linear polarization.

The phase retardation film **320** may include a birefringence film, an alignment film of a liquid crystal polymer, or a film supporting an alignment layer of the liquid crystal polymer, or the like, which is formed by stretching a film made of a proper polymer, such as polycarbonate or polyvinyl alcohol, polystyrene or polymethyl methacrylate, polypropylene or other polyolefins, or polyacrylate or polyamide.

The polarizer **240** serves as a circular polarizer because the linear polarization member **310** linearly polarizing the light in a set or predetermined direction and a phase retardation film **320** converting the linear polarization into the circular polarization are attached.

A first polarizer adhesive layer **340** is formed above the linear polarization member **310** to attach the linear polarization member **310** and the window **500** to each other. A second polarizer adhesive layer **330** is formed between the linear polarization member **310** and the phase retardation film **320** to attach the linear polarization member **310** and the phase retardation film **320** to each other.

The first polarizer adhesive layer **340** and the second polarizer adhesive layer **330**, as pressure sensitivity adhesive layers (PSA), are formed in a film shape including an adhesive, and perform an adhering operation in response to pressure provided from the outside. Such an adhesive may use an acryl-based or rubber-based adhesive having a refractive index in a range of 1.46 to 1.52, an adhesive containing particles such as zirconia in the adhesive in order to adjust the refractive index, or the like.

A protection film for preventing the phase retardation film **320** from being damaged due to a scratch or the like may be attached below the phase retardation film **320**. The protection film may be an acetate-based resin such as triacetyl cellulose or a triacetyl cellulous film saponifying on the surface with alkali or the like.

However, the polarizer **240** is not limited thereto, and polarizers having various structures may be used.

Further, a position and a size of the polarizer **240** will be described below in detail.

According to the exemplary embodiment, the window **500** may be disposed on the polarizer **240**. The window **500** serves to protect the polarizer **240**, the display panel **220**, and the like positioned below the window **500**.

In this case, the first adhesive layer **250** may be interposed between the window **500** and the polarizer **240**. The first adhesive layer **250** bonds the window **500** and the polarizer **240** with each other.

That is, the first adhesive layer **250** is attached to a lower surface of the window **500**, and the polarizer **240** may be attached below the window **500** through the first adhesive layer **250**.

In this case, the first adhesive layer **250** may be an optical clear (transparent) adhesive.

Meanwhile, according to an exemplary embodiment, as illustrated in FIG. **4**, a printing layer **270** is positioned between the first adhesive layer **250** and the polarizer **240**.

In this case, the printing layer **270** is formed to correspond to an edge region of the window **500**. When viewed from the top of the window **500**, the polarizer **240** positioned below the printing layer **270** is not exposed by the printing layer **270**.

In this case, a region W**1** formed by the printing layer **270** is a region which prevents an inside of the display device from being exposed, as a black region formed at the edge of the window, when viewed from the outside.

However, even though the printing layer **270** is formed so that the inside of the display device is not exposed, as illustrated in FIG. **3**, a lower portion of the printing layer **270** may be exposed. As a result, the edge of the polarizer **240** positioned below the resin layer **230** in the related art may be observed or exposed when viewed from the outside.

That is, as illustrated in FIG. **3**, the edge of the polarizer **240** exists in a region W**2** formed by the printing layer **270**, but the edge of the polarizer **240** may be observed from (or exposed to) a user. As such, the edge of the polarizer **240** is observed from (or exposed to) the outside to be misrecognized as a defect in the display device.

In the related art, in order to solve the problem, there is a method of increasing a width of the region W**2** formed by the printing layer **270**, but the method does not correspond to a recent trend to reduce or minimize a width of the printing layer **270**.

Accordingly, in order to solve the problem, according to an exemplary embodiment, the polarizer **240** is positioned on the resin layer **230**, and an area of the polarizer **240** is largely increased.

In more detail, the area of the polarizer **240** is larger than areas of the resin layer **230** and the display panel **220**. As illustrated in FIG. **4**, the area of the polarizer **240** is formed to correspond to the area of the window **500**. That is, the edge of the polarizer **240** may be positioned to correspond to the edge of the window **500**.

As a result, the edge of the polarizer **240** positioned below the printing layer **270** may be blocked or prevented from being exposed, when obliquely viewed from the outside. Further, a width of the region W**1** which is formed by the printing layer **270** may be reduced. That is, since the edge of the polarizer **240** is formed to correspond to the edge of the window **500**, even though the width of the region W**1** which is formed by the printing layer **270** is reduced, the edge of the polarizer **240** is not exposed.

Meanwhile, the supporter **300** is positioned to surround the display panel **220** and the resin layer **230**. The supporter **300** may surround the display panel **220** and the like and support the window **500**.

In this case, as illustrated in FIG. **4**, the supporter **300** may support the edge of the polarizer **240** overlapping with the edge of the window **500**.

The second adhesive layer **260** may be interposed between the supporter **300** and the polarizer **240**. The second adhesive layer **260** may attach the supporter **300** and the polarizer **240** with each other. In this case, the second adhesive layer **260** may be formed in a double-sided tape.

Meanwhile, a display device according to another exemplary embodiment will be described with reference to FIG. **5**. When describing the display device according to another exemplary embodiment, only a configuration different from the display device illustrated in FIG. **4** will be described in more detail, and the description of the duplicated configuration is omitted.

Referring to FIG. **5**, the printing layer **270** is positioned below the polarizer **240**. The printing layer **270** is positioned between the polarizer **240** and the resin layer **230**. In more detail, the edge of the printing layer **270** is positioned between the polarizer **240** and the resin layer **230**.

In this case, the printing layer **270** is positioned at an edge region of the window **500** and contacts the supporter **300**. Finally, the second adhesive layer **260** is interposed between the printing layer **270** and the supporter **300**.

Next, a manufacturing method of a display device according to an exemplary embodiment will be described with reference to FIGS. **6** and **7**.

First, the substrate **210** on which the display panel **220** may be formed is prepared.

In addition, the window **500** where the polarizer **240** is disposed on one side is prepared.

Next, the display panel **220** is formed on the substrate **210**. As described above, the thin film transistor **130**, the pixel (or first) electrode **160**, the organic emission layer **170**, the common (or second) electrode **180**, the thin film encapsulation layer **141**, and the like may be formed on the substrate **210**.

In addition, the resin layer **230** is coated on the display panel **220**. In this case, the resin layer **230** is coated in a liquid state.

Next, the substrate **210** and the display panel **220** are disposed inside the supporter **300**. After the display panel **200** is disposed inside the supporter **300**, the resin layer **230** may be coated on the display panel **200**, and after the resin layer **230** is coated on the display panel **220**, the display panel **220** may be disposed inside the supporter **300**.

Thereafter, the window **500** to which the polarizer **240** is attached is bonded on the resin layer **230**. In this case, the polarizer **240** is bonded so as to face the supporter **300** and the resin layer **230**.

In this case, before the window **500** is bonded on the resin layer **230** and the supporter **300**, the second adhesive layer **260** may be prepared on the supporter **300** in advance.

Next, the resin layer **230** is cured so that the window **500** is firmly attached on the display panel **220**. In this case, the resin layer **230** may be cured by ultraviolet rays. However, a method of curing the resin layer **230** is not limited thereto, and may apply various known methods capable of curing the liquid resin.

The display device and the manufacturing method thereof according to the exemplary embodiment may prevent the edge of the polarizer covered by the printing layer from being exposed outside the display device.

While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, and equivalents.

What is claimed is:

1. A display device, comprising:

a substrate;

a display panel on the substrate;

a resin layer on the display panel;

a polarizer on the resin layer;

a window on the polarizer;

a first adhesive layer between the window and the polarizer;

a printing layer positioned either between the first adhesive layer and the polarizer or between the polarizer and the resin layer; and

a supporter surrounding the display panel and the resin layer and supporting the window,

wherein the printing layer is positioned to correspond to an edge region of the window,

wherein an area of the polarizer corresponds to an area of the window, and

wherein the area of the polarizer is larger than areas of the resin layer and the display panel.

2. The display device of claim **1**, wherein:

the polarizer is supported by the supporter.

3. The display device of claim **2**, further comprising:

a second adhesive layer between the polarizer and the supporter.

4. The display device of claim **3**, wherein:

the second adhesive layer is a double-sided tape.

5. The display device of claim **1**, wherein:

the display panel comprises an organic light emitting element.

6. The display device of claim **1**, wherein:

the first adhesive layer is an optical clear adhesive.

7. The display device of claim **1**, wherein:

the polarizer comprises a linear polarization member and a phase retardation film disposed below the linear polarization member.

8. The display device of claim **7**, wherein:

the phase retardation film is a $\lambda/4$ phase retardation film.

9. The display device of claim **8**, wherein:

the polarizer further comprises a first polarizer adhesive layer on the linear polarization member.

10. The display device of claim **9**, wherein:

the polarizer further comprises a second polarizer adhesive layer between the linear polarization member and the $\lambda/4$ phase retardation film.

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